Opinion

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Gut Microbiota, MicroRNAs, and Cardiovascular Health: Exploring Mechanisms and Therapeutic Potential

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Introduction

Gut Microbiota (GM) refers to the complex community of microorganisms that live in the Gastrointestinal (GI) tract, including bacteria, fungi and protozoa. The human body is home to billions of microbes that form an interactive ecosystem. There are 1,014 microorganisms in the human gut, which make up 95% of the human microbiome. Studies have also reported that bacteroides and firmicutes account for 90% of the microbial species in the human gut, with the remainder being actinobacteria, cyanobacteria, fusobacterium, proteobacteria and verucomicrobia. These are present in the human body throughout the gastrointestinal tract, including the stomach, duodenum, jejunum, ileum and colon. Although atherosclerosis, a multifactorial process involving changes in the blood vessel wall, including factors such as rheology, dyslipidemia, and inflammation, plays an important role in the development of Cardiovascular Diseases (CVDs). This process affects the larger vessels rather than being specific to the atrial wall. The main risk factors for heart disease are poor diet, lack of physical activity, excess weight, insulin resistance and lifestyle habits such as alcohol consumption and smoking. The release of pro-inflammatory substances due to dysbiosis promotes the development and progression of atherosclerosis through the reduction of phosphatidylcholine and L-carnitine choline by the gut microbiota. In addition, the accumulation of Trimethylamine-N-oxide in the blood contributes to endothelial dysfunction and plaque formation, ultimately increasing cardiovascular risk.

Description

Inflammatory substances released by the gut microbiota lead to chronic inflammation in the blood vessels and the formation of the atherosclerotic plaque. These symptoms can block blood flow to the heart and brain, increasing the risk of coronary heart disease, stroke and other cardiovascular diseases. These metabolites also contribute to systemic inflammation and exacerbate cardiovascular health problems. This review briefly summarizes relevant information on the interaction between gut microbiota and mRNA target genes and different signalling pathways in the progression of CVDs. First, the understanding of the important role of the interaction between microRNAs (mRNAs) and the gut microbiota cannot be discussed. This is an important area for research that has the potential to open up new discoveries and treatments for a variety of conditions. In addition, we have discussed in depth the relationship between gut microbiota and mRNA in cardiovascular diseases. Therefore, the sign changes the severity of heart disease. So, the diagnosis changes the severity of the heart disease, which researchers can control with medical devices. By continuing to explore this, we can contribute to ground-breaking insights that could change the way heart-related diseases are treated, treated and prevented. In addition, we will briefly discuss the biogenesis and function of mRNAs, how they interact with the gut microbiota to control and target cell signalling pathways, and their role in human diseases. New therapeutic strategies may provide new opportunities for host health in the future.

Conclusion

Cardiovascular diseases, such as heart disease, stroke and heart failure, are a major global health challenge and a significant burden on the health system and the individual. Recent studies have shown a reliable link between mRNAs, gut microbiota and cardiovascular diseases. Large-scale studies are needed to characterize the appropriate target population and develop accurate methods for measuring mRNAs. Safe delivery methods are essential to exploiting the full potential of mRNA-based therapies in cardiovascular medicine. By implementing security measures, we can optimize the performance of this device and ensure better results. Research into therapeutic approaches involving the gut microbiota, as well as nutritional therapies and probiotics, will revolutionize the prevention and treatment of cardiovascular diseases. Although studies suggest that gut microbiota and mRNAs interact, the exact mechanism and their impact on host pathophysiology remain unclear. Therefore, unraveling the complex relationship between gut microbiota and mRNA is important to understand their impact on host health. Further studies should focus on specific pathways and signaling pathways and reveal the mechanisms by which these interactions are regulated and their effects on host physiology. Further in vivo experiments and molecular investigations are needed to confirm the impact of microbiota-mRNA interactions on host physiology.